Amended claim 4:

4. A method as in claim 1 and further characterized in that the sputtered alloy is deposited in a thin film having a thickness in the range of ~1μm to ~40μm.

Remarks

Amendments

The specification at page 2 at lines 7-8 has been amended to correct an inadvertent error as to identification of the patent that is incorporated by reference for the teaching of making SMA material in thin film form. The correct patent number 5,061,914 and the surname Busch of the first inventor are supplied by the present amendment.

The amendment to claim 4 is to correct an inadvertent error in which the word "of" was repeated.

Section 102(b) Rejection

Claims 1-9 were rejected under §102(b) as anticipated by Johnson '099 (Dr. Johnson is one of the coinventors of the invention in the present application).

It is well settled that the standard for anticipation under §102(b) is that of strict identity in that it must be shown that a single prior art source teaches all of the essential elements of the claim in question. Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 231 USPQ 81, 90 (Fed. Cir. 1986).

It is respectfully submitted that Johnson '099 does not and cannot anticipate because it lacks important and material method step limitations of the claims under rejection. That is, Johnson '099 does not teach the step of "applying a chemical etchant to the sacrificial layer for a time which is sufficient to etch the layer away to leave the thin film in a structure which is free standing from the substrate," followed by the step of "heating the thin film to an annealing temperature which is sufficient to crystallize the shape memory alloy."

In Johnson '099 the only SMA element is actuator 42. That actuator is not free standing but instead is not completely etched from the underlying materials. Thus, as explained at col. 6, lines 14-19 of the patent, the sputter deposition steps are such that each actuator "is attached at one end 88 to the substrate glass and at its other end to the spacer at area 72." Further, the patent explains at col. 6, lines 19-20 that "the remainder of the actuator, when in its undeformed shape, lies on the surface of the Al layer." It is only that "remainder of the actuator" which is released by etching away the Al layer. This is what was meant by the statement at col. 6, lines 21-22 that the Al is "etched away to release the actuators and the spacers from the substrate." In other words, the opposite ends of the actuators, after the etching step is completed, remain affixed to the respective substrate and spacer. The actuators never become "free standing" as in the method of the present invention.

The foregoing is clear because, if the actuators were free from the substrates and spacers, then it would not be possible for the actuators to raise the spacers, which is the entire objective of the Johnson '099 patent. Each actuator raises, or deploys, the spacer to which it is affixed by shortening in length when heated, thereby pulling on the spacer to pivot it upright. In that regard, Fig. 3 (un-deployed position) and Fig. 4 (deployed position) both show that actuator 42 is affixed at its ends to the substrate and spacer.

The remaining art of record also does not teach the steps of the claims which result in a free standing SMA element. Such free standing SMA elements have important advantages in many fields, such as medicine where they have application as very small stents to prevent restenosis after balloon angioplasty (see pg. 1, line 10 to pg. 2, line 16 of specification). SMA fabricated as a thin film can have a thickness as small as ~1μm to ~40μm (pg. 4, line 12). When made this size, the SMA stents can be inserted into very small blood vessels, such as in the brain, to treat aneurisms or filter out blood clots. The SMA material when so formed has a smooth surface, which avoids the problems with conventional stents, such as those made of

Version With Markings To Show Changes Made.

Amended paragraph starting at line 4 on page 2 of specification:

Sputter deposited thin film shape memory alloys such as thin film comprised of TiNi overcomes these problems. Such films can be fabricated in a range of thickness from less than 1μm to 40μm. SMA material can be made in thin film configurations in accordance the teachings of U.S. patent No. [5,061,880] 5,061,914 to [A. David Johnson et. al.] Busch et. al., the disclosure of which is incorporated by this reference.

4. (amended) A method as in claim 1 and further characterized in that the sputtered alloy is deposited in a thin film having a thickness in the range [of] of ~1μm to ~40μm.